

REQUEST FOR PROPOSALS

Developing Inexpensive Crash Countermeasures for Louisiana Local Roads

PROBLEM STATEMENT

Louisiana's transportation system includes nearly 60,000 miles of roads, of which approximately 44,000 miles are under the jurisdiction of local authorities and the remainder are state controlled. Of the estimated annual average of 160,000 traffic crashes which occur on Louisiana's roads, about 40% occur on the local system including 23% of the total fatalities. Thus, the local road network is important to reaching Louisiana's short and long term goals for fatality and serious injury reduction.

Local road agencies often lack the resources to adequately identify candidate locations for low cost safety improvements. They also often lack the means to estimate the cost of the safety improvements. This makes development of systematic improvement programs and investment decisions very difficult. Thus, the need exists to develop a method that allows identification of those locations in the local road network that are the most likely to experience high crash rates based on their traffic and geometric features, and to estimate the cost of those countermeasures that best address the safety problem.

RESEARCH OBJECTIVES

The overall goal of the research is to develop safety performance functions that will allow local roads in Louisiana to be classified by safety level, and establish cost estimation procedures for low cost countermeasures that address the greatest safety problems. The specific objectives are to:

1. develop the methodology to identify and classify local roads based on their expected safety performance
2. identify and locate the "riskiest" local road classifications using the expected safety performance functions and over-represented crash types
3. identify packages of low cost safety improvements for candidate locations and/or road classifications
4. develop procedures to estimate the cost of low-cost countermeasures
5. identify candidate locations for inclusion in a systematic safety improvement program that considers the effectiveness and cost of candidate countermeasures

SCOPE

The scope of this project is to identify the highest priority safety improvement program for Louisiana's local road system based on safety performance function analysis and cost estimates of system-wide improvements.

RESEARCH APPROACH

Task 1: Literature Review

Conduct a literature review on safety performance functions and countermeasures used

on local roads. With respect to the countermeasures, the emphasis must be on low-cost, easily-implemented procedures. The literature review can include international practice and can include informal communication through internet-based communication media. A written literature review that can form a section in the final report must be prepared and presented to the PRC for review and comment.

Task 2: Develop safety performance functions for local roads in Louisiana

Using the data from the Louisiana Crash Database, the Local Road File of the Surface Transportation Log, and traffic volume estimates from the Highway Performance Management System, establish safety performance functions that relate traffic and geometric features of local roads to the dominant types of crashes occurring on local roads in Louisiana. The dominant types of crashes that occur on local roads in the state can be determined by using the Louisiana Crash Database to estimate an over-representation factor defined as the proportion of crashes of a certain type on local roads, over the proportion of the same type of crash on all two-lane roads in the state. The safety performance function must be capable of estimating crash rates by crash type and severity level.

Task 3: Estimate safety risk level of local road sections in Louisiana

Using the safety performance function developed in task 2, estimate the safety performance of individual links of the local road network in Louisiana. An index of safety risk that combines safety performance at each severity level into a single value must be developed and used to rank road sections by risk level.

Task 4: Identify countermeasures

From the literature review, and in consultation with the participating local authority technical personnel and the PRC, identify inexpensive candidate countermeasures for each dominant crash type identified in task 2. The Accident Modification Factor (AMF), defined as the degree of improvement a countermeasure is expected to effect, must be established for each countermeasure identified.

Task 5: Estimate cost of candidate countermeasures

Using cost estimates from the literature as well as individual cost estimates from unit costs and resource estimates, estimate the cost of the candidate countermeasures identified in task 4.

Task 6: Establish program of road safety improvement

Establish a priority of road safety improvement by using the need for improvement, expressed by the over representation factor estimated in task 2, the degree of improvement, described by the AMF of the countermeasure considered, and the cost of implementing the countermeasure as identified in task 5. Priority should be directly related to need and degree of improvement, and inversely related to cost. The priority value should establish a ranking of improvements that can be used to develop a program of improvements and provide an estimate of the overall cost of improving local roads to acceptable levels of safety as expressed by the over-representation factor.

Task 7: Prepare Progress and Final Reports

Progress must be reported to the Project Review Committee (PRC) at 6-month intervals or at the discretion of the PRC. Progress will be reported in writing but may also be by audio-visual presentation if requested by the PRC. A final report must be submitted to LTRC three months before the end of the project. The research results must be presented in an audio-visual presentation to the PRC before the end of the project

SPECIAL NOTES

- A. Task descriptions are intended to provide a framework for conducting the research. LTRC is seeking the insight of proposers on how best to achieve the research objectives. Proposers are expected to describe research plans that can realistically be accomplished within the constraints of available funds and contract time. Proposals must present the candidate's current thinking in sufficient detail to demonstrate their understanding of the problem and the soundness of their approach.
- B. The proposal shall include travel to LTRC as necessary to meet with the Project Review Committee and statewide for conduct of the research. Out of state travel for the conduct of the research shall be identified in the proposal. Funding shall not be included for travel to conferences for presentation of results. Principal Investigators may request support for conference travel funding outside the project budget.
- C. LTRC projects are intended to produce results that will be applied in practice. It is to be expected that an implementation plan for moving the results of the research into practice will evolve as a concerted effort during this project. The final report must contain an implementation plan to include as a minimum, the following:
 - a. The "product" expected from the research;
 - b. A realistic assessment of impediments to successful implementation;
 - c. The activities necessary for successful implementation;
 - d. The criteria for judging the progress and consequences of implementation.
- D. To assist in the implementation process, the investigators of this research shall be prepared to present the final results to LaDOTD officials in an oral presentation to be held in Baton Rouge LaDOTD Headquarters after acceptance of the final report.

CONTRACT TIME

24 months

COST

\$100,000

AUTHORIZATION TO BEGIN WORK

October 15, 2010 (estimated)

PROPOSAL FORMAT

All proposals must be formatted according to LTRC Research Manual, 2003 edition (http://www.ltrc.lsu.edu/pdf/research_man03.pdf).

PROPOSAL SELECTION

The Project Review Committee selected for this project will review, evaluate and rank all proposals received according to the criteria listed in the proposal review form shown in figure 2-6 in the LTRC Research Manual

DEADLINE FOR RECEIPT OF PROPOSAL

September 24, 2010, 4.30 p.m.

An electronic copy of the proposal must be submitted to:

Mr. Harold R. Paul, P.E.

Director

Louisiana Transportation Research Center

4101 Gourrier Ave.

Baton Rouge, LA 70808

Tel: (225) 767 9131, e-mail: (Harold.Paul@la.gov)

CONTACT PERSON

Chester G. Wilmot, P.E., Ph.D.

Department of Civil and Environmental Engineering and

Louisiana Transportation Research Center

Louisiana State University

Baton Rouge, LA 70803

tel: (225) 578 4697, e-mail: cecgw@lsu.edu

LTRC GUIDE TO PROPOSAL DEVELOPMENT

PROPOSAL FORM AND CONTENT

This section provides the basic requirements for the form, sequence and content of the research proposal. The proposal is of paramount importance to both the researches and LTRC because upon approval of a research project, the proposal comprises the major portion of the contract document. The proposal shall contain, but is not limited to, the following essential elements.

- A. **PART I – IDENTIFICATION** – The title sheet, which includes the amount of funding requested; duration of project in months with beginning and ending dates indicated; a concise descriptive title for the proposed study; the name and business address of the organization which will conduct the work; the major subdivision of that organization responsible for the research; the name, title, mailing address and telephone number of the principal investigator who is to bear the responsibility for the successful performance of the proposed work; and the name and title of the co-principal investigators, if applicable.
- B. **PART II – APPROVAL** – for LTRC use only in the process of modification and /or approval of the proposal.
- C. **PART III – AMOUNTS REQUESTED FOR PROJECT** – The part of the proposal requires an itemized list of the funds requested for the proposed research by type of expense and fiscal year (July 1 through June 30.)
 1. **PERSONNEL** – List the names, position and percentage of time (based on a 40-hour work week) to be spent on the project for all persons involved in the research, including principal investigators (PI), co-principal investigator (CoPI), and graduate students, if applicable. When the percent time spent on the project varies with a given period (e.g., spring, fall, summer) the individuals periods and appropriate percent time shall be listed separately for each. The amounts requested for each person listed must not exceed the proportion of total salary computed from the percent time spent of the project listed for that person. The salaries used as the basis for computing individual personnel costs shall be exclusive of the cost of employee benefits; however, that percentage used by the contracting agency to compute employee benefits shall be shown where indicated on the form and the costs computed and included in totals.
 2. **NON-EXPENDABLE EQUIPMENT** – Itemize non-expendable equipment, software or database which are to be purchased specifically for the performance of the study. Non-expendable equipment includes any item having a useful life of more than one year and an acquisition cost of more than \$300 per unit.
 3. **CONSUMABLE SUPPLIES** – This item includes the estimated cost of all expendable equipment, materials and supplies. Any item for which the cost exceeds \$300.00 must be listed individually.
 4. **TRAVEL** – Itemize expenses for trips to be made in connection with the research project and state the purpose of the trip. Expenses incurred for out-of-date travel should be listed separately from those for in-state travel. When travel expenses are requested for conferences, conventions and seminars in connection with the research, each instance must be separately identified and justified in terms of the work to be performed.
 5. **OTHER EXPENSES** – Itemize all miscellaneous expenses associated with the project, such as those required for reference materials, copying, computer time, photography, equipment maintenance, telephone usage, etc. All costs to be incurred for equipment rental or use of subcontractors/consultants associated with the project should be listed in this section.
 6. **TOTAL DIRECT COSTS** – The summation of total estimated costs for items (1) through (5).
 7. **TOTAL INDIRECT COSTS** – This item is intended to provide reimbursement for general and research administration and overhead expenses incurred by the contraction agency in the prosecution of the research project for which no charge is made elsewhere in the study. The total indirect costs shall not exceed 25 percent of the total direct costs, excluding employee benefits. The actual percentage used and method of application shall be described in Part VIII of the proposal and shall be verifiable through audits by the Department, the FHWA or their representatives.
 8. **TOTAL COSTS** – The summation of the total estimated costs for items (1) through (7).

- D. PART IV – BIOGRAPHICAL SKETCHES** – Provide brief sketches for the professional personnel who are indicated by Part III, Section (1) to be actively engaged in the study.
- E. PART V – TITLE VI STATEMENT** – This portion of the proposal shall include a statement that the agency or contractor will comply with the provisions contained in Title VI of the Civil Rights Act of 1964.
- F. PART VI – PROBLEM STATEMENT** – A brief statement of the problem to be solved through research.
- G. PART VII – OBJECTIVES OF RESEARCH** – A clear, concise and comprehensive itemization of the goals which are anticipated to be obtained through the proposed research.
- H. PART VIII – SCOPE** – A clear, concise and descriptive statement relating the degree to which the problem is to be addressed and the extent and range of the proposed research.
- I. PART IX – RESEARCH WORK PLAN** – The work plan is the basic guide to the study which contains the detailed description of the approach that the principal investigator intends to employ to complete the study and implement the results. It shall contain the following elements in the sequence indicated:
- 1. METHOD OF PROCEDURE** – This section should describe the details of the researcher's approach to solving the problem:
 - (a) APPROACH** – For each phase of the proposed research, discuss the tasks that are necessary in order to fulfill the specific aims given in (G) above. The discussion should include principles or theories to be used; devices, processes, materials or systems to be developed; possible solutions to the problems; critical experiments to test the applicability of the theory, the type and range of variables to be tested or considered; and the methods of data analysis to be used including statistical methods. The preparation of the final report should be acknowledged.
 - (b) WORK SCHEDULE** – A time chart in the format shown in Figure 2-7 shall indicate the proposed time schedule for completion of each of the tasks (and subtasks when applicable) discussed in part (a). This should include preparation of progress, interim (if applicable) and final reports.
 - (c) DELIVERABLES** – An itemized listing of all project deliverables and the associated completion date(s) for submission of each. Include in this listing all draft and final reports, software, manuals, specifications, programs and systems etc.
 - 2. STAFFING PLAN** – The responsibilities and time allocation of personnel to the required tasks should be briefly stated for each fiscal year for the duration of the project.
 - 3. FACILITIES AVAILABLE** – The general facilities at the disposal of the proposing agency which are relevant to the study should be described, along with major items of permanent equipment to be used.
 - 4. SIGNIFICANCE OF RESEARCH** – The importance of the proposed work should be explained in this section. The findings of the literature survey detailed in Part X should be discussed, and it should be demonstrated that previous work has not attempted to solve the problem using the same approach, or that the proposed study will extend, modify or refine the work of others. This section should support the researcher's approach and state why he believes it is the best.
 - 5. IMPLEMENTATION** – An assessment by the researcher of the areas of potential application of the anticipated research findings. The form in which the findings might be reported (mathematical model or formula, test procedure, specification, design procedure, etc.) should be described. The specific area of practice that would be changed by the findings and those organizations or groups that might benefit from the new technology should be identified. The responsibility for and means of technology transfer relative to the study should be proposed when possible.
- J. PART X – SUPPORTING DATA** – This section includes information required to support the research work program proposed in Part VII.
- 1. PREVIOUS WORK BY RESEARCHERS** – The researchers should list and describe briefly any previous work they have done to date that is pertinent to the proposed study. Personal publications on the subject area or closely related work should be cited. (List no more than five.)
 - 2. RESULTS OBTAINED BY OTHERS** – Describe the results of a literature research for information relative to the findings of others which are pertinent to the proposed study. The findings available through HRIS are required for all Type A studies.
 - 3. AMOUNTS REQUESTED** – Provide justification for the itemized amounts shown in Part III for nonexpendable equipment, equipment rental, travel and other items. It is required that the

manner in which indirect costs are calculated and applied be stated.

K. PART XI – LIST OF REFERENCES – A numerical list of references used in the text of the proposal should be included, in the order referred to in the text.

LOUISIANA TRANSPORTATION
RESEARCH CENTER
RESEARCH PROPOSAL

(LTRC USE ONLY) Page 1
DATE OF RECEIPT

LTRC PROJECT NO.

STATE PROJECT NO.

PART I: GENERAL INFORMATION

1. AMOUNT REQUESTED (SAME AS PART III)

\$

2. DURATION OF PROJECT

ANTICIPATED START DATE _____ ACTUAL START DATE _
DURATION IN MONTHS _ ENDING DATE _____

3. TITLE OF RESEARCH PROPOSAL (PLEASE BE BRIEF)

4. NAME AND BUSINESS ADDRESS OF PROPOSER
(INDIVIDUAL, INSTITUTION, FIRM, OR CORPORATION)

5. NAME, TITLE, AND MAILING ADDRESS OF PRINCIPAL INVESTIGATOR
(BEARING SCIENTIFIC RESPONSIBILITY)

TELEPHONE NUMBER AND EXTENSION OF BUSINESS OFFICE

TELEPHONE NUMBER AND EMAIL ADDRESS OF PRINCIPAL INVESTIGATOR

6. MAJOR SUB-DIVISION THAT WILL CONDUCT RESEARCH

7. NAME AND TITLE OF CO-PRINCIPAL INVESTIGATOR

PART II: APPROVAL

RECOMMEND BY THE ASSOCIATE DIRECTOR LTRC, RESEARCH

DATE

Mark Morvant, P.E.

RECOMMENDED BY THE DIRECTOR, LTRC

DATE

Harold R. Paul, P.E.

RECOMMENDED BY CHAIRMAN, LTRC POLICY COMMITTEE

DATE

Richard Savoie, P.E.

RECOMMENDED BY IMPLEMENTATION SPONSOR

DATE

APPROVED BY THE DOTD SECRETARY

DATE

Sherri LeBas, P.E.

APPROVED MODIFICATIONS:
(LTRC USE ONLY)

Part IV - BIOGRAPHICAL SKETCHES - Provide brief sketches for professional personnel already selected who are to be actively engaged in this project. The following questions should be completed with co-principal researcher immediately following principal researcher, followed by other professional personnel.

NAME OF PRINCIPAL INVESTIGATOR		TITLE		
DATE OF BIRTH	PLACE OF BIRTH	SEX	CITIZENSHIP 9 US 9 OTHER (SPECIFY)	
EDUCATION (DEGREES CONFERRED - IDENTIFY HONORARY DEGREES IN FIELD)	DEGREE	INSTITUTION CONFERRING	FIELDS	YEAR
OTHER RESEARCH TRAINING AND EXPERIENCE, PARTICULARLY IN AREA COVERED BY THIS APPLICATION	LOCATION	NATURE	YEAR	
FIELDS OF PRESENT MAJOR SCIENTIFIC INTEREST IN ORDER OF CHOICE				
NAME OF CO-PRINCIPAL INVESTIGATOR		TITLE		
DATE OF BIRTH	PLACE OF BIRTH	SEX	CITIZENSHIP 9 US 9 OTHER (SPECIFY)	
EDUCATION (DEGREES CONFERRED - IDENTIFY HONORARY DEGREES IN FIELD)	DEGREE	INSTITUTION CONFERRING	FIELDS	YEAR
OTHER RESEARCH TRAINING AND EXPERIENCE, PARTICULARLY IN AREA COVERED BY THIS APPLICATION	LOCATION	NATURE	YEAR	
FIELDS OF PRESENT MAJOR SCIENTIFIC INTEREST IN ORDER OF CHOICE				
NAME		TITLE		
DATE OF BIRTH	PLACE OF BIRTH	SEX	CITIZENSHIP 9 US 9 OTHER (SPECIFY)	
EDUCATION (DEGREES CONFERRED - IDENTIFY HONORARY DEGREES IN FIELD)	DEGREE	INSTITUTION CONFERRING	FIELDS	YEAR
OTHER RESEARCH TRAINING AND EXPERIENCE, PARTICULARLY IN AREA COVERED BY THIS APPLICATION	LOCATION	NATURE	YEAR	
FIELDS OF PRESENT MAJOR SCIENTIFIC INTEREST IN ORDER OF CHOICE				

PART V TITLE VI STATEMENT

The attention of the proposed research contracting agency or institution is directed to the need to comply with the requirements of Title VI of the Civil Rights Act of 1964.

_____ (Name of Contracting Agency) acknowledges that we are aware of the requirements of Title VI and will not discriminate on the basis of race, creed, sex, or national origin and will endeavor to involve the members of minority groups in the conduct of the proposed contract research study.

TECHNICAL RESEARCH PROPOSAL

Details of the proposed plan and other necessary data shall be typed (double-spaced) in accordance with the sequence and requirements defined in Chapter 2 of the LTRC Research Procedure Manual. Continue numbering pages in sequence for the entire proposal using the continuation sheet.

PART VI SUMMARY OF PROPOSED RESEARCH

LOUISIANA TRANSPORTATION RESEARCH CENTER

PROPOSAL REVIEW FORM

PROBLEM STATEMENT NO.

TITLE:

SUBMITTED BY: NAME

UNIVERSITY

Please rate each proposal individually and provide your assessment of rating points for each category A-E. Total the rating points in item F.	POINT RATING
A. OBJECTIVE AND APPROACH OF THE WORK (20 pts) 1. Proposal reflects conceptual understanding of problem (10 max) 2. Are the objectives and approach proposed (10 max) a. clear and easy to understand? b. likely to produce the deliverables required?	
B. PROCEDURE (20 pts.) 1. Is the overall procedure or methodology (10 max) a. adequately described? b. appropriate to the study? 2. Are the experimental methods and/or data analysis techniques (10 max) a. adequately described? b. appropriate to the study?	
C. BUDGET AND TIME SCHEDULE (15 pts) 1. Is budget within requirements? (5 max) 2. Is the budget reasonable for scope, personnel, and travel necessary to accomplish study requirements? (10 max)	
D. PERSONNEL (35 pts) 1. What is your evaluation of the qualifications, experience and management ability of the principal investigator and support staff relative to their specific assignments? (25 max) 2. Is the apportionment of personnel level (time allocated) to accomplish specific tasks appropriate and realistic? (10 max)	
E. FACILITIES AND EQUIPMENT (10 pts) 1. In your estimation, are available facilities and equipment listed adequate to accomplish study requirements? (5 max) 2. Is need for purchase of equipment listed adequately documented and justified? (5 max)	
F. OVERALL POINT TOTAL	
G. IS PROPOSAL ACCEPTABLE ____ YES ____ NO	
H. COMMENTS Your comments below will be helpful to assist LTRC in making final decisions. Attached continuation sheets for additional comments, if necessary. (List improvements needed or deficiencies in proposal.)	
INDIVIDUAL RATING PROPOSAL	